

Auroras were most frequent in: North Dakota, on eight days; Washington, six days; Massachusetts, seven days.

#### CANADIAN DATA—THUNDERSTORMS AND AURORAS.

Auroras were reported as follows: 1st, Quebec. 3d, Port Arthur. 6th, Medicine Hat. 17th, Charlottetown. 19th, Port Arthur. 20th, Minnedosa. 21st, Quebec and Port Arthur. 28th, Toronto. 29th, Port Arthur. 30th, Charlottetown, Medicine Hat, and Prince Albert.

Thunderstorms were reported as follows: 1st, Prince Albert. 2d, Minnedosa and Medicine Hat. 3d, Charlottetown,

Port Stanley, Minnedosa, and Medicine Hat. 4th, Saugeen, Port Arthur, Winnipeg, and Qu'Appelle. 5th, Father Point. 6th, White River, Port Stanley, and Edmonton. 7th, Father Point, Montreal, Rockliffe, and Toronto. 8th, Quebec and Montreal. 9th, St. Andrews and Port Arthur. 10th, Swift Current. 11th, Father Point, Quebec, Montreal, Rockliffe, Toronto, Saugeen, and Parry Sound. 23d, Minnedosa. 26th, Rockliffe, Parry Sound, and Medicine Hat. 27th, Minnedosa. 29th, White River. 30th, Father Point and Edmonton. 31st, Yarmouth and St. Andrews.

### SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere, as a whole, is very nearly constant from year to year, but the proportion received by the surface of the earth depends largely upon the absorption by the atmosphere, and varies with the distribution of cloudiness. The sunshine is now recorded automatically at 17 regular stations of the Weather Bureau by its photographic, and at 28 by its thermal effects. At three stations records are kept by both methods. The results are given in Table XI for each hour of local, not seventy-fifth meridian, time. The cloudiness is determined by numerous personal observations at all stations during the daytime, and is given in the column of "average cloudiness" in Table I; its complement or clear sky is given in the last column of Table XI.

#### COMPARISON OF SUNSHINE AND CLEAR SKY.

The sunshine registers give the *duration* of direct sunshine whence the percentage of possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. It should not be assumed that these numbers should agree, and for comparative purposes they have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observer's personal estimates of percentages of area of clear sky; the average excess for May, 1895, is 11 per

cent for photographic records, and 13 per cent for thermometric records. The details are shown in the following table:

#### *Difference between instrumental and personal observations of sunshine.*

Photographic stations.	Instrumental.	Personal.	Difference.	Thermometric stations.	Instrumental.	Personal.	Difference.
Tucson, Ariz. ....	87	65	22	Key West, Fla. ....	80	59	21
Cleveland, Ohio. ....	69	58	11	St. Louis, Mo. ....	80	59	21
Dodge City, Kans. ....	69	61	8	San Francisco, Cal. ....	74	55	19
Denver, Colo. ....	68	51	17	Buffalo, N. Y. ....	73	54	19
Kansas City, Mo. ....	68	52	16	Chicago, Ill. ....	73	62	11
Cincinnati, Ohio. ....	67	55	12	Cincinnati, Ohio. ....	72	55	17
Salt Lake City, Utah. ....	67	45	22	Rochester, N. Y. ....	72	58	14
Memphis, Tenn. ....	64	58	6	Columbus, Ohio. ....	69	49	20
Santa Fe, N. Mex. ....	63	54	9	Detroit, Mich. ....	68	60	8
Helena, Mont. ....	59	50	9	Portland, Me. ....	68	39	29
Savannah, Ga. ....	59	51	8	Salt Lake City, Utah. ....	67	45	22
Galveston, Tex. ....	59	58	1	Atlanta, Ga. ....	65	53	12
San Diego, Cal. ....	50	54	4	Louisville, Ky. ....	64	50	14
Eastport, Me. ....	48	36	12	New Haven, Conn. ....	64	60	4
Bismarck, N. Dak. ....	46	45	1	Boston, Mass. ....	63	46	17
Spokane, Wash. ....	46	30	16	Marquette, Mich. ....	62	35	27
Portland, Oreg. ....	44	40	4	Vicksburg, Miss. ....	62	55	7
				Washington, D. C. ....	62	51	11
				Norfolk, Va. ....	61	62	-1
				Philadelphia, Pa. ....	61	44	17
				Little Rock, Ark. ....	60	41	19
				Des Moines, Iowa. ....	58	42	16
				New Orleans, La. ....	55	55	0
				New York, N. Y. ....	55	50	5
				Baltimore, Md. ....	54	48	6
				Seattle, Wash. ....	46	32	14
				Wilmington, N. C. ....	45	45	0
				Portland, Oreg. ....	44	40	4

### METEOROLOGY AND MAGNETISM.

By Prof. FRANK H. BIGELOW.

For general remarks relative to this subject see page 7 of the REVIEW for January, 1895.

The comparison of the air temperature with magnetic horizontal force is shown in detail on Chart V, and the special features of the May curves are as follows:

#### SPECIAL FEATURES OF THE MAY CURVES.

There are no corrections for amplitude or slope. For the mean datum +2 is applied to temperature and +17 to magnetic force. The barometric pressures of May are plotted exactly as for April.

### INLAND NAVIGATION.

The *extreme and average stages of water* in the rivers during the current month are given in Table VII, from which it appears that none of the rivers there recorded reached the dan-

ger line during the month; the nearest approach was that of the Sacramento, which was within 3 feet of the danger line on the 9th.

### STATE WEATHER SERVICES.

By Mr. JAMES BERRY, Chief of State Weather Service Division.

The following extracts are taken from the reviews published by the services of the respective States:

*Alabama.*—The most notable feature of the weather for the month was the prolonged cool spell over the entire State from the 19th to the

28th, during which time the temperature ranged from 2° to 17° below the seasonal normals, and light frosts occurred in exposed places in the northern portions on the 13th, 14th, 18th, and 23d. The month closed with very warm weather during the last two days, when the temperature was as high as 98° in the northeast portion. The average